

Description

Bowler's Positive Control System And Method

SUMMARY OF INVENTION

[0001] A primary objective in bowling is a two rotary motions placed on the ball, called roll and spin, roll being the rotation of the ball in the direction of travel and spin being the rotation of the ball about an axis intersecting the roll axis and typically orthogonal to the roll axis. Most bowlers experience great difficulty in giving this combined rotation to the ball in any consistent manner. A description of one of many attempts to assist the bowler in imparting spin and roll are described in Pat. No. 4,371,163 of Shaffer. Described in that same Pat. No. 4,371,163, is the technique used by bowlers of using one or more middle fingers to deliver spin and roll to the ball in a process generally known as lift, or lifting the ball on its release from the bowler's hand.

[0002] In lifting the ball on its release, the ball must be made to

rotate in a forward direction, i.e., along an axis which is horizontal and perpendicular to the direction of motion. This rotation causes the ball to roll in the desired direction down the alley. Secondly, the ball should have a component of rotation, called spin, along a vertical axis, counterclockwise as viewed from above (if thrown with the right hand). This spin is largely responsible for achieving a desired scattering of the pins as they fall.

[0003] Many students of the bowling art have recognized that the middle two fingers, which occupy adjacent holes in the ball, should be the source of the desired roll. These fingers should rotate the underside of the ball upward, an effect called lift as they leave the ball upon its release from the bowler's middle fingers. One or more of the bowler's middle fingers are used to lift the ball giving it this complex rotation about two axes and also to grip the ball with sufficient control at its delivery and release to prevent or reduce slippage and to enable the bowler to achieve lift with the most revolutions on the ball the bowler is capable of delivering, which is important to scattering the pins and achieving a strike. Attempts to achieve a better grip generally use a surface between the finger and the ball which increases the surface friction and

the surface counter force to the force developed when lifting and releasing the ball in a direction to displace the finger placement relative to the ball. A device of this kind is shown in published patent application No.

20030045367, published March 6, 2003, describing a polymeric material being substantially resilient and elastic which fits onto the finger end and with projections which may be hemispherical for contacting the surface of the ball. Depending upon the pressure exerted by the finger, the projections will flatten, forming a circular face onto the bowling ball and assisting in the bowler's grip of the bowling ball enabling the bowler to better initiate rotation as the bowling ball is released.

[0004] Solution of the problem faced by the bowler of establishing control and an means for developing a gripping force over the contact area made between the bowler's finger and the ball through the ball's finger hole, is not solved by any of the devices as now known or used. The device shown and described in published patent application No. 20030045367, published March 6, 2003, for example, requires a resilient material which has the property of displacement under force, displacing the placement of the relative position of the finger pad and the opposed sur-

face in the bowling ball finger hole, impairing the alignment of the contact area made between the bowler's finger pad and finger hole in the ball and the positive control over the lift applied by the bowler's finger through that same contact area.

- [0005] In an attempt to improve a bowler's control over the delivery of the ball, bowling ball finger hole inserts are used, for example as described in U.S. Patent 4,892,308, of Gaunt, and the patents cited therein. Inserts, as shown and described in these patents, are used to better fit the finger hole to the bowler's finger or provide structural or dimensional changes into the finger hole to relieve stress on the finger and provide better ball control.
- [0006] This invention according to the disclosed inventive principles and as shown in a preferred embodiment, comprises a system, in a disclosed preferred embodiment, for positive ball control comprising interlocking surfaces, shown as an insert for a bowling ball finger hole with a three dimensional surface for mating or co-acting with a three dimensional surface on bowler's finger pad cover, as may be mounted on a bowler's middle finger pad. However, as would be understood by those skilled in the art, the invention and inventive principles disclosed are not limited

to a finger hole insert but may be applied to the interior surface of the bowling ball finger hole, and are not limited to a finger pad cover but may be applied to any device used with the bowler's hand and extending to the bowler's fingers. The purpose of the invention is to provide these interlocking or mating or co-acting substantially inelastic surfaces to develop a force to counteract or oppose shifting or displacing the placement and alignment of the contact area between the finger pad cover and the finger hole insert interior surface, under the forces developed when delivering and releasing the ball and directed against that alignment.

[0007] The three dimensional surfaces according to the disclosed inventive principles and the disclosed preferred embodiment, may be ridges, or protrusions of any geometrical shape or size, arranged relative to a primary axis drawn longitudinally along the finger pad cover from a first end opposite the finger tip to the directly opposite end opposite the finger joint, and with a matching primary axis drawn longitudinally, from the top of the bowling ball finger hole at the surface of the ball to the directly opposite location at the finger hole bottom. These three dimensional surfaces may be arranged in a pattern or patterns

that are at any angle, to these axes.

[0008] The mating interlocking opposed surfaces on the finger pad cover and the interior surface of the finger hole, or insert, may be arranged to provide a counter force to any movement of the finger pad cover relative to the bowling ball finger hole, in a direction at any angle to the direction in the release of the ball, for example as shown in preferred embodiment, at an angle to the primary axis along the finger pad or the matching primary axis of the finger hole or finger hole insert. Where, in a preferred embodiment for example, a counter force is established by mating surfaces on the finger pad cover and the finger hole interior surface that opposes relative displacement in the direction of the matching primary axis and primary axis or in the direction of the release of the ball from the finger pad cover, the bowler's delivery can be adjusted for any loss in kinetic energy caused by overcoming this counter force opposing release of the ball.

[0009] In a preferred embodiment, the use of the disclosed system of mating surfaces preventing a shift in relative displacement of the finger pad cover and the finger hole surface, gives the bowler a positive control over the alignment of the ball with the middle finger which is not avail-

able with a single gripping surface on the finger or in the finger hole, for example by an insert in the finger hole or by a gripping device on the finger of the bowler.

[0010] The disclosed system in a preferred embodiment, may use a substantially inelastic two dimensional surface on the bowler's finger pad and on the bowling ball insert or interior surface of the ball's finger hole, to develop a counter force against a force produced when releasing and lifting the ball directed to displacing the position of the bowler's finger pad from the bowling ball finger hole insert. In this system, as described according to the inventive principle and in a preferred embodiment, the bowler retains positive control over the orientation of the finger pad as the substantially inelastic two dimensional surfaces prevent or reduce any shifting of the finger hole surface relative to the surface of the finger pad, even where contact area made by the finger pad and the finger hole insert or finger hole surface, remains undisturbed. What is disclosed in a preferred embodiment according to the disclosed inventive principles is a system of interlocking surfaces on bowler's finger pad cover and on a bowling ball finger hole insert for producing a force to counteract shifting of the ball relative to the bowler's -finger pad and the con-

tact area made between the finger pad cover and the finger hole insert, comprising, first means for mounting an interlocking three dimensional surface on a finger pad; second means for mounting an interlocking three dimensional surface on the finger hole of a bowling ball, with the first and second means co-acting to produce a counter force opposed to movement of said first means relative to said second means.

- [0011] The first means may include a means defining a primary axis and the second means may include means defining a matching primary axis and the first and second means producing a counter force at an angle to the primary or the matching primary, axis. The counter force may be produced at an orthogonal angle to these aforesaid axes, and the second means may include means for limiting the depth of insertion of the first means into the finger hole. The first means may include a cover for covering the finger tip and for providing a substantially inelastic contact area between said finger tip and said finger hole.
- [0012] By inelastic is meant a material that is sufficiently stiff, for example a steel or aluminum material or plastic material, to resist the forces produced at the release of a bowling ball, without deformation. By elastic is meant a material

that deforms under the forces produced at the release of the bowling ball. As would be understood by those skilled in the art, the inventive principles may be applied to the interior surface of a bowling ball finger hole or to a finger hole insert without departing from the disclosed inventive principles and finger hole and finger hole insert, may be used interchangeably herein without departing from the disclosed inventive principles.

[0013] In accordance with the disclosure of the inventive system is shown interacting surfaces for controlling the alignment of a bowler's finger with a bowling ball, comprising, first means for insertion into in a bowling ball finger hole; second means for mounting on a finger pad and for forming a contact area with said first means when said second means is inserted in said first means, the first and second means including at least one means on at least one of said first or second means for producing a frictional force opposing the displacement of said first means or said second means, from said contact area. In this system is at least one means on at least one of these first or second means for deforming in response to a force from the other of said first or second means. Within the disclosed system is an adhesive layer and wherein the first or second means

forms a two dimensional surface for forming a frictional contact with the other of said first means or second means and including means for making the first or second means inelastic to the force of the bowling ball at its release or wherein the first or second means forms a two dimensional surface for forming a frictional contact with the other of the first means or second means and including means for making the first or second means elastic to the force of the bowling ball at its release.

- [0014] The first means may be an elongated stud and said second means may be a groove for interlocking with said stud or at least one hemisphere protrusion and said second means may be a hemisphere indentation for interlocking with said hemisphere protrusion.
- [0015] As would be understood by those skilled in the art, the interlocking surface may be in a finger hole insert or on the wall of the ball's finger hole, without departing from the principles of the invention. By primary axis and matching primary axis is meant an axis substantially aligned with the direction of the bowling ball at its release. However, as would be known to those skilled in the art, the interlocking three dimensional surfaces may be aligned at an angle with these axes to the extent the smooth separation of

the ball from the finger at its release is not substantially impeded.

[0016] The method according to the disclosed inventive principles is of sets of surfaces on a bowler's finger pad cover and on the surface of a bowling ball finger hole or finger hole insert for producing a force to counteract shifting of the ball relative to the bowler's finger pad and the contact area made between the finger pad cover and the finger hole or finger hole insert interior surface with the steps of arranging interlocking three dimensional surfaces on a finger pad cover and on a bowling ball insert, to develop a force counter to shifting of the relative position of said finger pad cover and the bowling ball insert or the contact area made between the finger pad cover and the finger hole insert; placing the interlocking three dimensional surface on a finger pad in mating relationship with the interlocking three dimensional surface on the interior surface of a bowling ball finger hole or finger hole insert.

[0017] In the disclosed method is the step of using the interlocking sets of surfaces to develop a force counter to a force directed for shifting the said contact area made between the finger pad cover and the finger hole insert or relative position of said finger pad cover and the finger hole in-

sert.

[0018] In a system for controlling the alignment of a bowler's middle finger with a bowling ball, when lifting the ball at its release, disclosed is a first means for interlocking a finger hole of a bowling ball with a bowlers finger and for aligning the bowler's finger with said bowling ball. The first means includes means for defining a longitudinal axis and means for developing a counter force to a force intersecting with said longitudinal axis. The term longitudinal with respect to the finger pad cover or the finger hole, is described in the detailed description of the invention.

[0019] The disclosed inventive system is disclosed according to the inventive principles and in a preferred embodiment as system of interacting surfaces for controlling the alignment of a bowler's finger with a bowling ball, comprising, a first means for insertion into in a bowling ball finger hole, a second means for mounting on a finger pad and for forming a contact area with said first means when said second means is inserted in said first means; the first and second means including at least one means on at least one of said first or second means for producing a frictional force opposing the displacement of said first means

or said second means, from said contact area. The system includes at least one means on at least one of the first or second means for deforming in response to a force from the other of said first or second means and wherein the first or second means is means forming an adhesive layer. In the disclosed inventive system, the first or second means forms a two dimensional surface for forming a frictional contact with the other of said first means or second means and includes means for making the first or second means inelastic to the force of the bowling ball at its release. In the system the first or second means can form a two dimensional surface for forming a frictional contact with the other of the first means or second means and includes means for making the first or second means elastic to the force of the bowling ball at its release.

BRIEF DESCRIPTION OF DRAWINGS

- [0020] Figure 1 is a partial view of a bowling ball showing a finger hole insert.
- [0021] Figure 2 is a view of a finger hole insert.
- [0022] Figures 3a, b, and c, are views of a stud and groove system according to the inventive principles.
- [0023] Figures 4a, b, and c, are views of a hemisphere indenta-

tion and protrusion system according to the inventive principles.

- [0024] Figures 5a, b, and c, are views of a multi stud and groove system according to the inventive principles.
- [0025] Figures 6a, b, and c, are view of a system according to the inventive principles using mating two dimensional surfaces on the finger pad and on the finger hole insert or finger hole surface.

DETAILED DESCRIPTION

- [0026] The invention as described by the disclosed inventive principles comprises matching or interlocking surfaces in the area of contact made by the interior surface of a bowling ball finger hole and finger pad cover mounted on a bowler's middle finger pad for achieving positive control when used in releasing the ball and imparting lift to the ball on its release.
- [0027] Figure 1 shows a bowling ball 10, in partial view, with a finger hole insert 11 when inserted into finger hole 12 and with the insert 11 shown partially in phantom. As would be understood by those skilled in the art, the disclosed invention and the inventive principles may be used in a preferred embodiment with a finger hole insert 11 or may be applied directly on the interior surface of the fin-

ger hole 12. The finger hole, or finger hole insert inner surface 14, as shown includes a three dimensional surface, shown generally by numeral 15 on insert inner surface 14, and with base 16 and side walls 18a and 18b, defining a groove disposed parallel to a matching primary axis 22, extending longitudinally through the insert 11, as shown in Fig. 2. In a preferred embodiment, the three dimensional surface 15, is a groove, extending along an axis 22 extending from the annular opening 19 of the finger hole insert 11, to its bottom 21 and in a direct line with the matching primary axis 22. For the purposes of explanation, axis 22 is identified at the matching primary axis, and is related to the primary axis 37 of the finger pad cover 31, extending from the end adjacent or opposed to the finger tip in a direct line to the end opposed or adjacent to the finger joint, as shown in Figure 3b.

- [0028] In a preferred embodiment, as shown in Figure 3c, a stop 20 may be placed at a point along the length of the three dimensional surface 15, to limit the depth of the interlocking three dimensional surface 39 on the finger pad cover, for example as disclosed in a preferred embodiment in Figure 3a.
- [0029] An example of an insert is shown in Fig. 2, where the

three dimensional surface 15 is shown as a groove defined by bottom surface 16 and side walls 18a and 18b. As would be known to those skilled in the art, the depth and spacing of bottom surface 16, the length of the groove defined by a stop 20 placed in the groove, and the spacing between the side walls 18a and 18b, may be varied without departing from the disclosed principles of the invention.

[0030] Fig. 3a, 3b, and 3c, shows in a preferred embodiment, the mating or coacting or cooperative interlocking surfaces in the finger hole insert 11 and on the finger pad cover 31. The finger pad cover 31 is shown generally in Fig. 3a and 3b, as having a tip 33, a contact surface shown generally by 35, a primary axis 37, and a three dimensional surface shown in a preferred embodiment with a protrusion shown as a stud 39. In the preferred embodiment disclosed in Fig. 3a and 3b, the three dimensional surface 39 is a stud which fits into, or interlocks with, a matching three dimensional groove surface 15 of the finger hole insert 11, as shown in Fig. 3c.

[0031] Adjustments may be made in the three dimensional surface, for example as shown in a preferred embodiment of Fig. 3c, by placing a stop 20 along the length of the

groove in three dimensional surface 15, shown as defined by bottom 16 and side walls 18a and 18b. In the preferred embodiment shown in Fig 3c, a stop 20 is shown in the bottom 16 of the said groove. The size or length of the stud 39 may be varied according to the disclosed inventive principles and without departing from the disclosed invention, as shown by the longer stud 39a shown in phantom. When the system of the finger pad and the finger hole insert is place in contact, a contact area is formed, for example as may be shown by contact area 61 in Figures 3b and 3c.

- [0032] The finger pad 31 may be mounted on the bowler'" finger 45 by means of a glove 43, for example, without limitation of the inventive principles the finger pad 31 may include a stop 47 at ent 41 to limit the depth of insertion of the bowler'" finger into the finger hole. The position and size of the stop 47 may be varies to suit the needs of individual bowlers.
- [0033] In Figures 4a, b, and c, the three dimensional surface 15 comprises one or more indentations 49a and 49b, which are shown as hemispherical, with matching pattern shown as protrusions 49a' and 49b' on the surface 35 of the finger pad cover, as shown in Figures 4a and 4b. Figure 5b

shows the three dimensional surface 15 having one or more indentations 51a and 51b, which are elongated in the direction of the matching primary axis 22 and with an interlocking pattern 51 on surface 35 as shown by numerals 51a' and 51b' in Figures 5a and 5b. As would be known and understood by those skilled in the art, the three dimensional surface 15 on the finger hole insert and the matching or co--acting or interlocking surface 35 on the finger pad cover 31, may be any of the three dimensional patterns or any combination of the disclosed three dimensional patterns, or any other patterns for interlocking or mating or co-acting.

[0034] The finger pad cover 31 is shown in Figures 3a and b for example is disclosed as having a tip 33 and with a three dimensional pattern 39 on surface 35 for interlocking or mating with a matching pattern on the surface 15 of the finger hole 11. In a preferred embodiment, the finger pad cover three dimensional surface 35, is a stud 39 extending at least partially along the three dimensional surface 35, with its primary axis 37, shown as along the surface 35 from the end of the finger pad cover 31 adjacent or opposed to the finger tip 33, to the end 41, adjacent or opposed to the finger joint. An adjustment may be made

in the three dimensional pattern 39 by adjusting its length for example by extending its length as shown by the extended stud 39a, shown in phantom.

- [0035] In a preferred embodiment, the finger pad cover 31 is shown mounted on a glove 43 enclosing a bowler's middle finer 45, but other suitable devices could be used to mount the finger pad cover 31 on the bowler's finger and opposed to the finger pad, without departing from the disclosed principles of the invention.
- [0036] As would be apparent to those skilled in the art, the three dimensional surface 35, shown on the finger pad cover 31, co-acts or matches or interlocks with the three dimensional surface 15, of insert 11.
- [0037] The finger pad cover 31 may include an insertion stop 47 mounted on the end 41 of the finger pad cover 31, to limit the depth of insertion of the bowler's finger into the bowling ball finger hole.
- [0038] The disclosed invention as shown by a preferred embodiment and the disclosed inventive principles is not limited to the groove and stud as shown in Figs. 1, 2, and 3a, b, and c, but may be expanded to other co-acting or interlocking three dimensional surfaces 15 on the inner surface 14 of a finger hole insert or on the finger hole 12,

and on the finger pad cover 33, as would be apparent. An example would be as shown in Figs. 4a, b, and c of at least a hemisphere depressions 49a and b, or indentation in the finger hole insert 11 three dimensional surface 15, and a matching or co-acting hemisphere protrusions 49a' and b' in the three dimensional surface 35 in the surface of the finger pad cover 31. In another example as shown in Figs. 5a, b, and c, one or more slots or grooves 51a and 51b may be formed as the three dimensional surface 15 of the finger hole insert 11 with matching or co-acting stud protrusions 51a' and 51b' in the three dimensional surface 35 of the finger pad cover 31.

[0039] As would apparent to one skilled in the art, the matching or coacting members forming the three dimensional matching or interlocking or co-acting surfaces 15 and 35, may be varied by the number, shape, or position relative to the displacement about the matching primary axis 22, or primary axis 37, or along the cover and on the inner matching primary axis 22, and the principles of the invention are not limited to the examples shown for a preferred embodiment in Figures 1 through 5. The material of the co-acting or interlocking or matching surfaces should be inelastic or stiff and resistant to deformation, on the order

of a stainless steel or aluminum and may be made of any suitable plastic material which resists deformation when subject to the forces produced by the delivery and release and lifting of the bowling ball, to provide for a stable relative position of the finger pad cover relative to the contact area and its position made with the finger hole or finger hole insert. The three dimensional surfaces 15 and 35, can be finished with a smooth surface to allow the bowler to smoothly and easily release the ball without undue friction.

[0040] However, as would be understood by those skilled in the art, and consistent with the foregoing, the surfaces 15 or 35, may be made by a material which can be shaped in the field, for example by use of a material with a memory which may be used in an insert and which would hold the shape formed when a finger pad cover three dimensional surface 35 is inserted therein. The invention is not limited to whether the indentations or protrusions are on the insert surface 15 or finger pad surface 35 or whether the material with a memory is used on the finger pad cover surface 35 or the insert surface, or whether an insert into the finger hole is used or the interior surface of the finger hole is made according to the disclosed inventive princi-

ples.

[0041] The operation of the invention is described as follows. In inserting n one or more of the bowler's middle fingers into a respective finger hole or finger hole insert, a bowler positions the finger pad cover 31 and the finger pad surface 35 relative to the interior surface 15 of the finger hole or finger hole insert 12 and creates a contact area, show for example by numeral 61 in figure 3b, between the finger pad cover 31 and its surface 35 and the interior surface 15 of the finger hole or finger hole insert 11. For explanation purposes, as stated above, that contact area is shown in phantom generally by 61 in Figs. 3b and 3c. In delivering and releasing the ball, and in lifting the ball, the bowler tries to maintain the position of the middle finger in the finger hole or the finger hole insert. However, due to the forces generated in the delivery and release of the ball, the ball may be moved relative to the bowler's finger, shifting the position of the ball and moving the contact area 61 by relative movement of the finger pad cover 31 and the interior surface 14 of the finger hole 12 or finger hole insert 11.

[0042] The co-acting or cooperating or interlocking three dimensional surfaces 15 on the finger hole interior or finger

hole insert interior and 35 on the finger pad cover, provide a counter force to an orthogonal force or any other force imposed at an angle to the primary axis 37 or matching primary axis 22, or at an angle to the direction of the release of the ball and acting against the relative displacement of the finger pad cover 31 and the finger hole interior surface 14 and the intended contact area 61 position of the surfaces 15 and 35.

- [0043] The tip 33 of the finger pad cover 31 places a hard non deforming inelastic surface between the bowler's finger tip and the bowling ball, transferring the kinetic energy from the bowler'" acceleration of the middle fingers in lifting the ball at its release, into the rotation of the ball and its velocity, without an substantial loss of force and the acceleration placed on the ball.
- [0044] The size, displacement and location, of the three dimensional surfaces, 15 and 35, may be varied depending on the individual needs of the bowler. For example a bowler with a need for greater lateral control would choose a longer stud such as stud 39a over the shorter stud 39. Similarly, the size and location of the stop 20 or the insertion stop 47, may be varied according to the individual choice of the bowler. As would be known to those skilled

in the art, the invention is not dependent on the size, location, or displacement, of the three dimensional surfaces. By displacement is meant the depth or volume, by size is meant the length and width or diameter, and by location is meant the location relative to the matching primary axis 22 and primary axis 37, or any other meaningful dimension indicative of the shape of the three dimensional surfaces selected.

[0045] The inventive principles may be as disclosed in Figure 6a, b, and c, including a surface 75 on the interior 77, of the finger hole insert 11, and a cooperating surface 95 on the finger pad cover 31 and wherein at least one of said surfaces, surface 75 or surface 95, is a smooth surface, producing a frictional force opposed to displacement of the finger pad cover 31 from the contact area 61, and for example as shown in Figure 3b and 3c. In a preferred embodiment, for example, the surface may be on the surface of the finger hole insert 12. However, surfaces may be used on the surface of the finger hole insert 12 and on the finger pad 31 to increase friction. In a preferred embodiment, the surface may be an adhesive layer. The material used for the system of the finger hole insert 11 and the finger pad 31 may be stiff and inelastic under the forces

produced by the release of the bowling ball, for example, steel or aluminum or a plastic material having similar characteristics, as explained in the foregoing. In a preferred embodiment, the surfaces 75 of the finger hole insert 11 and surface 95 of the finger pad cover may be made of a material having a higher coefficient of friction than the surface of the bowling ball.

- [0046] In the inventive system as shown and described in a preferred embodiment, the surfaces 75 or 95 may be elastic and deformable under the force of the bowling ball at its release. The surface of the finger hole insert 11 or the surface of the finger pad 31 may be made with protrusions which are elastic and serve to increase the coefficient of friction in the inventive system of the finger pad and the finger hole insert, as shown and described herein.
- [0047] In a preferred embodiment, and according to the inventive principles, the surfaces of the finger pad 31 or the finger hole insert 11, may be made from a material that deforms and forms an impression of an opposite three dimensional surface and which retains the impression during contact and for a temporary period of time before returning to its original shape upon separation from contact with the opposite three dimensional surface.

[0048] As shown, the finger pad cover according to the disclosed inventive principles is mounted on the bowler's finger by means of a glove but as would be known to those skilled in the art, any other suitable means for mounting the finger pad cover as is now or hereafter known, can be used without departing from the disclosed inventive principles.

[0049] Although the invention is shown and described using a three dimensional interlocking surface any other known or hereafter developed interlocking means for developing a cooperating force between the bowler's finger and the finger hole, may be used without departing from the disclosed inventive principles. Alternatively, a two dimensional surface may be used in the finger hole insert or finger pad cover or in each , to produces a frictional force to counter a force disposed in a direction to displace the finger pad cover from the contact area made with the finger hole insert.

[0050] The disclosed invention is shown according to a preferred embodiment which is not to be thought of as limiting of the inventive principles.